MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2015/2016

BQT1614 – QUANTITATIVE ANALYSIS

(All sections / Groups)

11 MARCH 2016
9.00 a.m – 12.00 p.m
(3 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of **NINE (9)** printed pages excluding the cover page and statistical tables.
2. This question paper consists of 5 structured questions. Attempt **ALL** questions.
3. Students are allowed to use non-programmable scientific calculators with no restrictions.
4. Statistical tables are attached at the end of the question paper.
5. Please use **pen** to write the answers.
6. Please write all your answers in the Answer Booklet provided.

QUESTION 1 (20 MARKS)

The owner of Susa Computer Company makes its own computer and delivers them directly to customers who order via the internet. The computers are stored in the warehouses from which it generally takes 1 day to deliver to the customer. He has observed 25 lead time periods and records the demand during each period. The data are listed in the following table:

235	261	361	316	348	499	466	369	334
421	386	439	309	302	462	332	330	
394	374	374	514	296	344	253	535	

(a) Find mean, standard deviation and median.

(5 marks)

(b) Determine the relative of dispersion of the number of demands.

(3 marks)

(c) Describe the distribution of data through Pearson's Coefficient of Skewness.

(3 marks)

(d) The supporting staff of Susa Computer Company has told the owner that they need to have sixty customers per month in order to succeed in their delivery operation. The staff are willing to continue the delivery if they can be at least 95 percent certain that they will gain profit at least in one month. Using the data above, what will be the percentage of assurance that Susa Computer Company will break even?

(6 marks)

(i) How many of demand would be needed to gain profits within 7.9% margin error with 95% confidence level?

(3 marks)

Continued...

QUESTION 2 (20 MARKS)

(a) The health department routinely conducts two independent inspections of each restaurant, with the restaurant passing only if both inspectors pass it. Inspector A is very experienced, hence, passes only 2 percent of restaurants that actually do have health code violations. Inspector B is less experienced and passes 17 percent of restaurants with violations. What is the probability that:

(i) Inspector A passes a restaurant given Inspector B had passed it too.

(3 marks)

(ii) Inspector B passes a restaurant given Inspector A had failed the inspection of the restaurant

(4 marks)

(iii) Inspector A provides unsatisfactory result for an inspection given Inspector B had failed the inspection of the restaurant

(4 marks)

(b) On average, five birds hit the Washington Monument and are killed each week. Bill Gatsby, an official of the National Parks Service, has requested that Congress allocate funds equipment to scare birds away from the monument.

(i) Determine the probability of two birds hit and killed in a week.

(2 marks)

(ii) Calculate the probability of at most one bird hit and killed in two weeks.

(3 marks)

(iii) A Congressional Subcommittee has replied that funds could not be allocated unless the probability of more than three birds being killed in any week exceeds 0.7. Will the funds be allocated?

(4 marks)

Continued...

QUESTION 3 (20 MARKS)

(a) The Uniform CPA Examination protects the public interest by helping to ensure that only qualified individual becomes licensed as Certified Public Accountants (CPAs). Operational question have also been statistically evaluated to ensure they meet the psychometric requirements of the CPA exam. Section scores are reported on a scale that ranges from 0 to 99. A total reported score of 75 is required to pass the exam. A survey of accounting students reveals that among CPA scores above 75, 66% took a preparatory course, whereas among CPA scores of less than 75 only 13% took a preparatory course. An accounting student has determine that he need a score of more than 75 to get the certificate but the chances of getting that high a score is 8%. Determine the probability of scoring more than 75 given he did not take a preparatory course. Solve the question by drawing the tree diagram.

(8 marks)

(b) A company, recently have been criticized for not paying women as much as men working in the same positions. They claim that its average salary paid to all employees is RM 25,300. From a random sample of 29 women in the company, the average salary was calculated to be RM 21,355. If the population standard deviation is known to be RM 1520 for these jobs, determine whether the company's claim is true at 5% significance level.

(6 marks)

(c) According to a research center survey, 79% of adults were using the internet in August 2013 and 83% were using it in August 2014. Suppose that these percentages are based on random samples of 2000 adults in August 2013 and 2300 in August 2014. Can we conclude that the adults in August 2013 internet usage were lower than the adults in August 2014?

(6 marks)

Continued...

QUESTION 4 (20 MARKS)

It seems reasonable that the more hours per week a full time college student works at a certain job, the less time he or she will have to study. Loacker College had collected average number of hours that their students spend as a part timer in any job and the GPA score to build a regression equation. The collected information is provided below:

Average number of hours worked	20	28	10	35	5	14	0	40	8	23
GPA	2.8	3.2	3.1	2.4	3.4	3.3	2.8	2.1	3.8	1.8

(a) State the independent and dependent variables.

(2 marks)

(b) Identify the relationship which exist between these two variables using correlation of coefficient

(5 marks)

(c) Compute the coefficient of determination and fully interpret its meaning.

(3 marks)

(d) Use the method of least squares to estimate the regression line between the average number of hours worked and GPA score.

(5 marks)

(e) What does the slope of the estimated regression line indicate?

(2 marks)

(f) Predict the GPA score if a student spends 42.5 hours as a part timer for any job. Explain the reliability of the prediction.

(3 marks)

Continued...

QUESTION 5 (20 MARKS)

(a) Julie Pristash, the marketing manager of Mod. Stereo, a manufacturer of blank compact disc, has compiled the following information regarding unit sales for year 2010 and 2013:

Length of tape (minutes)	2010		2013	
	Price (RM)	Quantity	Price (RM)	Quantity
30	2.20	32	2.85	22
60	2.60	119	3.15	135
90	3.10	75	3.25	90
120	3.30	16	3.40	11

(i) Determine the Aggregate Price Index for 2013 period. Explain.

(2 marks)

(ii) Compute and interpret the Laspeyres Price Index (LPI) for 2013 using 2010 as the base period.

(3 marks)

(iii) Compute and interpret the Paashe Price Index (PPI) for 2013 using 2010 as the base period.

(3 marks)

(iv) Calculate the Fisher's Price Index for 2013. Interpret your calculation.

(2 marks)

(b) A person amortizes a loan of RM 575 000 for a new home by obtaining a 27-year mortgage at the rate 16.79% compounded monthly. Find the monthly payment, the total interest charges and the principal remaining after 15 years.

(6 marks)

(c) In 17 years, a RM 88 000 machine will have a salvage value of RM 8 800. A new machine at that time is expected to sell for RM 92 000. In order to provide funds for the difference between the replacement cost and the salvage value, a sinking fund is set up into which equal payments are placed at the end of each year. If the fund earns 9.23% compounded annually, how much should each payment be?

(4 marks)

End of Page

STATISTICAL FORMULAE

A. DESCRIPTIVE STATISTICS

Mean $(\bar{x}) = \dfrac{\sum_{i=1}^{n} X_i}{n}$

Standard Deviation $(s) = \sqrt{\dfrac{\sum_{i=1}^{n} X_i^{\,2}}{n-1} - \dfrac{(\sum_{i=1}^{n} X_i)^2}{n(n-1)}}$

Coefficient of Variation $(CV) = \dfrac{\sigma}{\overline{X}} \times 100$

Pearson's Coefficient of Skewness $(S_k) = \dfrac{3(\overline{X} - Median)}{s}$

B. PROBABILITY

P (A or B) = P (A) + P (B) – P (A and B)

P (A and B) = P (A)× P (B) if A and B are independent

P (A | B) = P (A and B) ÷ P (B)

Poisson Probability Distribution

If X follows a Poisson Distribution , $P(\lambda)$ where $P(X = x) = \dfrac{e^{-\lambda}\lambda^x}{x!}$

then the mean = $E(X) = \lambda$ and variance = $VAR(X) = \lambda$

Binomial Probability Distribution

If X follows a Binomial Distribution B(n, p) where $P(X = x) = {}^nC_x p^x q^{n-x}$

then the mean = $E(X) = np$ and variance = $VAR(X) = npq$ where $q = 1 - p$

Normal Distribution

If X follows a Normal distribution, $N(\mu, \sigma)$ where $E(X) = \mu$ and $VAR(X) = \sigma^2$

then $Z = \dfrac{X - \mu}{\sigma}$

C. CONFIDENCE INTERVAL ESTIMATION AND SAMPLE SIZE DETERMINATION

(100 – α) % Confidence Interval for Population Mean (σ Known) = $\mu = \overline{X} \pm Z_{\alpha/2}\left(\sigma/\sqrt{n}\right)$

(100 – α)% Confidence Interval for Population Mean (σ Unknown) = $\mu = \overline{X} \pm t_{\alpha/2,n-1}\left(s/\sqrt{n}\right)$

(100 – α)% Confidence Interval for Population Proportion = $\pi = p \pm Z_{\alpha/2}\sqrt{\dfrac{p(1-p)}{n}}$

Sample Size Determination for Population Mean $= n \geq \left[\dfrac{(Z_{\alpha/2})\sigma}{E}\right]^2$

Sample Size Determination for Population Proportion $= n \geq \dfrac{Z^2 \times p(1-p)}{E^2}$

Where E = Limit of Error in Estimation

D. HYPOTHESIS TESTING

One Sample Mean Test

Standard Deviation (σ) Known	Standard Deviation (σ) Not Known
$Z = \dfrac{\bar{x} - \mu}{\sigma/\sqrt{n}}$	$t = \dfrac{\bar{x} - \mu}{s/\sqrt{n}}$

One Sample Proportion Test

$$Z = \frac{p - \pi}{\sqrt{\dfrac{\pi(1-\pi)}{n}}}$$

Two Sample Mean Test

Standard Deviation (σ) Known	Standard Deviation (σ) Not Known
$z = \dfrac{(\overline{x}_1 - \overline{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\sigma_1^2/n_1 + \sigma_2^2/n_2}}$	$t = \dfrac{(\overline{x}_1 - \overline{x}_2) - (\mu_1 - \mu_2)}{\sqrt{S_p^2\left(1/n_1 + 1/n_2\right)}}$ where $S_p^2 = \dfrac{(n_1-1)S_1^2 + (n_2-1)S_2^2}{(n_1 + n_2 - 2)}$

Two Sample Proportion Test

$$Z = \frac{(p_1 - p_2) - (\pi_1 - \pi_2)}{\sqrt{\bar{p}(1-\bar{p})\left(\dfrac{1}{n_1} + \dfrac{1}{n_2}\right)}} \quad \text{where } \bar{p} = \frac{X_1 + X_2}{n_1 + n_2};\ p_1 = \frac{X_1}{n_1};\quad p_2 = \frac{X_2}{n_2}$$

where X_1 and X_2 are the number of successes from each population

E. REGRESSION ANALYSIS

Simple Linear Regression

$$Y_i = \beta_0 + \beta_1 X_1 + \varepsilon_I \text{ Where } \beta_0 = \bar{Y} - \beta_1 \bar{X} \text{ and } \beta_1 = \frac{\sum XY - \left[\frac{\sum X \sum Y}{n}\right]}{\left[\sum X^2 - \left(\frac{(\sum X)^2}{n}\right)\right]}$$

Correlation Coefficient

$$r = \frac{\sum XY - \left[\frac{\sum X \sum Y}{n}\right]}{\sqrt{\left[\sum X^2 - \left(\frac{(\sum X)^2}{n}\right)\right]\left[\sum Y^2 - \left(\frac{(\sum Y)^2}{n}\right)\right]}} = \frac{COV(X,Y)}{\sigma_X \sigma_Y}$$

ANOVA Table for Regression

Source	Degrees of Freedom	Sum of Squares	Mean Squares
Regression	*1*	SSR	MSR = SSR/1
Error/Residual	$n-2$	SSE	MSE = SSE/$(n-2)$
Total	$n-1$	SST	

Test Statistic for Significance of the Predictor Variable

$$t_i = \frac{b_i}{S_{b_i}} \text{ and the critical value} = \pm t_{\alpha/2,(n-p-1)}$$

Where p = number of predictor

F. INDEX NUMBERS

Simple Price Index

$$P = \frac{p_t}{p_0} \times 100$$

Laspeyres Quantity Index

$$P = \frac{\sum p_0 q_t}{\sum p_0 q_0} \times 100$$

Aggregate Price Index

$$P = \frac{\sum p_t}{\sum p_0}(100)$$

Paasche Quantity Index

$$P = \frac{\sum p_t q_t}{\sum p_t q_0} \times 100$$

Laspeyres Price Index

$$P = \frac{\sum p_t q_0}{\sum p_0 q_0} \times 100$$

Fisher's Ideal Price Index

$$\sqrt{(Laspeyres\ Price\ Index)(Paasche\ Price\ Index)}$$

Paasche Price Index

$$P = \frac{\sum p_t q_t}{\sum p_0 q_t} \times 100$$

Value Index

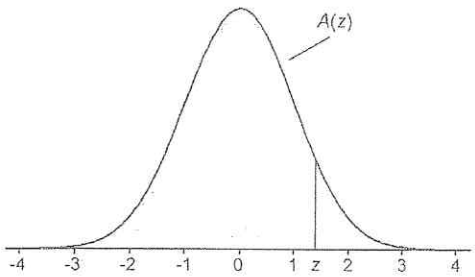
$$V = \frac{\sum p_t q_t}{\sum p_0 q_0} \times 100$$

G. FINANCIAL MATHEMATICS

Simple Interest	Compounded Interest
$I = Pnr$ $A = P(1 + nr)$	$I_t = P[(1+i)^n - 1]$ $A_t = P(1+i)^n$
Effective Rate of Interest	**Sinking Fund**
$r_{effective} = \left(1 + \frac{r}{m}\right)^m - 1$	$S = R\left[\frac{(1+i)^n - 1}{i}\right]$
Future Value	**Present Value**
$A_t = P(1+i)^n$	$P = A(1+i)^{-n}$
Future Value of an Annuity	**Present Value of an Annuity**
$FV_A = R\left[\frac{(1+i)^n - 1}{i}\right]$	$PV_A = R\left[\frac{1-(1+i)^{-n}}{i}\right]$
Amortization	
$R = \left[\frac{P(i)}{1-(1+i)^{-n}}\right]$	

TABLE A.1

Cumulative Standardized Normal Distribution



$A(z)$ is the integral of the standardized normal distribution from $-\infty$ to z (in other words, the area under the curve to the left of z). It gives the probability of a normal random variable not being more than z standard deviations above its mean. Values of z of particular importance:

z	$A(z)$	
1.645	0.9500	Lower limit of right 5% tail
1.960	0.9750	Lower limit of right 2.5% tail
2.326	0.9900	Lower limit of right 1% tail
2.576	0.9950	Lower limit of right 0.5% tail
3.090	0.9990	Lower limit of right 0.1% tail
3.291	0.9995	Lower limit of right 0.05% tail

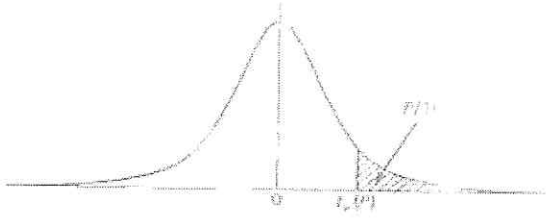
z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990
3.1	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993
3.2	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995
3.3	0.9995	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997
3.4	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9998
3.5	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998
3.6	0.9998	0.9998	0.9999							

TABLE 10. PERCENTAGE POINTS OF THE t-DISTRIBUTION

This table gives percentage points $t_\nu(P)$ defined by the equation

$$\frac{P}{100} = \frac{1}{\sqrt{\nu\pi}} \frac{\Gamma(\frac{1}{2}\nu+\frac{1}{2})}{\Gamma(\frac{1}{2}\nu)} \int_{t_\nu(P)}^{\infty} \frac{dt}{(1+t^2/\nu)^{\frac{1}{2}(\nu+1)}}.$$

Let X_1 and X_2 be independent random variables having a normal distribution with zero mean and unit variance and a χ^2-distribution with ν degrees of freedom respectively; then $t = X_1/\sqrt{X_2/\nu}$ has Student's t-distribution with ν degrees of freedom, and the probability that $t \geqslant t_\nu(P)$ is $P/100$. The lower percentage points are given by symmetry as $-t_\nu(P)$, and the probability that $|t| \geqslant t_\nu(P)$ is $2P/100$.



The limiting distribution of t as ν tends to infinity is the normal distribution with zero mean and unit variance. When ν is large interpolation in ν should be harmonic.

P	40	30	25	20	15	10	5	2·5	1	0·5	0·1	0·05
$\nu = 1$	0·3249	0·7265	1·0000	1·3764	1·963	3·078	6·314	12·71	31·82	63·66	318·3	636·6
2	0·2887	0·6172	0·8165	1·0607	1·386	1·886	2·920	4·303	6·965	9·925	22·33	31·60
3	0·2767	0·5844	0·7649	0·9785	1·250	1·638	2·353	3·182	4·541	5·841	10·21	12·92
4	0·2707	0·5686	0·7407	0·9410	1·190	1·533	2·132	2·776	3·747	4·604	7·173	8·610
5	0·2672	0·5594	0·7267	0·9195	1·156	1·476	2·015	2·571	3·365	4·032	5·893	6·869
6	0·2648	0·5534	0·7176	0·9057	1·134	1·440	1·943	2·447	3·143	3·707	5·208	5·959
7	0·2632	0·5491	0·7111	0·8960	1·119	1·415	1·895	2·365	2·998	3·499	4·785	5·408
8	0·2619	0·5459	0·7064	0·8889	1·108	1·397	1·860	2·306	2·896	3·355	4·501	5·041
9	0·2610	0·5435	0·7027	0·8834	1·100	1·383	1·833	2·262	2·821	3·250	4·297	4·781
10	0·2602	0·5415	0·6998	0·8791	1·093	1·372	1·812	2·228	2·764	3·169	4·144	4·587
11	0·2596	0·5399	0·6974	0·8755	1·088	1·363	1·796	2·201	2·718	3·106	4·025	4·437
12	0·2590	0·5386	0·6955	0·8726	1·083	1·356	1·782	2·179	2·681	3·055	3·930	4·318
13	0·2586	0·5375	0·6938	0·8702	1·079	1·350	1·771	2·160	2·650	3·012	3·852	4·221
14	0·2582	0·5366	0·6924	0·8681	1·076	1·345	1·761	2·145	2·624	2·977	3·787	4·140
15	0·2579	0·5357	0·6912	0·8662	1·074	1·341	1·753	2·131	2·602	2·947	3·733	4·073
16	0·2576	0·5350	0·6901	0·8647	1·071	1·337	1·746	2·120	2·583	2·921	3·686	4·015
17	0·2573	0·5344	0·6892	0·8633	1·069	1·333	1·740	2·110	2·567	2·898	3·646	3·965
18	0·2571	0·5338	0·6884	0·8620	1·067	1·330	1·734	2·101	2·552	2·878	3·610	3·922
19	0·2569	0·5333	0·6876	0·8610	1·066	1·328	1·729	2·093	2·539	2·861	3·579	3·883
20	0·2567	0·5329	0·6870	0·8600	1·064	1·325	1·725	2·086	2·528	2·845	3·552	3·850
21	0·2566	0·5325	0·6864	0·8591	1·063	1·323	1·721	2·080	2·518	2·831	3·527	3·819
22	0·2564	0·5321	0·6858	0·8583	1·061	1·321	1·717	2·074	2·508	2·819	3·505	3·792
23	0·2563	0·5317	0·6853	0·8575	1·060	1·319	1·714	2·069	2·500	2·807	3·485	3·768
24	0·2562	0·5314	0·6848	0·8569	1·059	1·318	1·711	2·064	2·492	2·797	3·467	3·745
25	0·2561	0·5312	0·6844	0·8562	1·058	1·316	1·708	2·060	2·485	2·787	3·450	3·725
26	0·2560	0·5309	0·6840	0·8557	1·058	1·315	1·706	2·056	2·479	2·779	3·435	3·707
27	0·2559	0·5306	0·6837	0·8551	1·057	1·314	1·703	2·052	2·473	2·771	3·421	3·690
28	0·2558	0·5304	0·6834	0·8546	1·056	1·313	1·701	2·048	2·467	2·763	3·408	3·674
29	0·2557	0·5302	0·6830	0·8542	1·055	1·311	1·699	2·045	2·462	2·756	3·396	3·659
30	0·2556	0·5300	0·6828	0·8538	1·055	1·310	1·697	2·042	2·457	2·750	3·385	3·646
32	0·2555	0·5297	0·6822	0·8530	1·054	1·309	1·694	2·037	2·449	2·738	3·365	3·622
34	0·2553	0·5294	0·6818	0·8523	1·052	1·307	1·691	2·032	2·441	2·728	3·348	3·601
36	0·2552	0·5291	0·6814	0·8517	1·052	1·306	1·688	2·028	2·434	2·719	3·333	3·582
38	0·2551	0·5288	0·6810	0·8512	1·051	1·304	1·686	2·024	2·429	2·712	3·319	3·566
40	0·2550	0·5286	0·6807	0·8507	1·050	1·303	1·684	2·021	2·423	2·704	3·307	3·551
50	0·2547	0·5278	0·6794	0·8489	1·047	1·299	1·676	2·009	2·403	2·678	3·261	3·496
60	0·2545	0·5272	0·6786	0·8477	1·045	1·296	1·671	2·000	2·390	2·660	3·232	3·460
120	0·2539	0·5258	0·6765	0·8446	1·041	1·289	1·658	1·980	2·358	2·617	3·160	3·373
∞	0·2533	0·5244	0·6745	0·8416	1·036	1·282	1·645	1·960	2·326	2·576	3·090	3·291